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APPENDIX I.

[Vide answer to Short Notice Question No. 11, asked by Sri S. Lazar at the meeting of the Legislative Assembly held on 23rd August 1961, page 621 *supra* .]

STATEMENT REGARDING CAUVERY FLOODS.

Government are aware of the deep concern which Members of this House have, over the recent very heavy floods in the Cauvery and their anxiety to take effective measures to mitigate the effect of floods in future. They therefore feel appropriate to place the facts of the case before the Members for their information. As Members are aware, the South-West Monsoon during the current year (1961) had a very early and heavy beginning and it was very active throughout the month of July. The effect of the monsoon was felt in the Cauvery basin on the 28th June 1961 for the first time. The views of the Metereological Department are that this year's south-west monsoon has proved to be a record for half a century. The incidence and intensity of the rainfall were both unprecedented. Rainfall in the Mercara region from 1st June to about 24th July was 335 centimeters while the average rainfall for the south-west monsoon over a period of 40 years was only 150 centimeters. This shows that there had been an increase in the incidence of the rainfall by about 125 per cent above normal. Even in the year 1924 when the heaviest floods occurred in Cauvery, the rainfall over a period of ten days was only 160 centimeters; whereas this year it was 190 centimeters.

2. The river Cauvery has its origin in Mercara in Coorg in the Western Ghats and after flowing 500 miles through Mysore and Madras States, empties into Bay of Bengal near Kaveripattinam in Thanjavur district. There are two large important reservoirs across the main river, viz., one at Krishnarajasagar in Mysore State with a capacity of 44,800 m.c.ft. and the other at Mettur in Madras State with a capacity of 93,500 m.c.ft. At Upper Anicut the river divides into two, the Cauvery proper and the Coleroon which is the main flood carrier. Twenty miles below this is the Grand Anicut originally constructed by Karikal Chola in the Second Century A.D. Here the normal supplies required for irrigation under the Cauvery, the Vennar and the Grand Anicut Canal (the last one constructed under the Cauvery-Mettur Project) are being drawn and the surplus let into Coleroon. The Lower Anicut constructed across the Coleroon about 70 miles below Grand Anicut, is carrying supplies to South Arcot district as well as to the north-eastern corner of Thanjavur district.

There are three important tributaries which fall into the Cauvery below Mettur Dam—the Bhavani, Amaravathi and the Noyyal. Reservoirs across the first two have been built with capacities of 28,000 m.c.ft. and 4,000 m.c.ft. respectively.

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3. Before the outbreak of the recent monsoon, the river Cauvery was practically dry and the storages in Mettur and Bhavani reservoirs were very low. It may be remembered that because of the low storage position in Mettur, there was even a power cut for industries during May 1961 and for the same reason water for irrigation in Cauvery delta was not released till 19th June 1961, though the normal date of opening is 12th June 1961.

4. There was continuous downpour of rains in the Mercara region from 30th June 1961, and this was the first indication of the heavy flood in the catchment of Cauvery, Krishnarajasagara, situated in the Mysore State, is the first reservoir to catch up the run off from the Mercara region and the surplus from this reservoir comes down to Mettur Dam. The controlling officer, Krishnarajasagara, issues telegraphic message to the controlling officer at Mettur Dam, furnishing the discharges from the Krishnarajasagara whenever it is above 60,000 cusecs. The first telegram received from the Krishnarajasagara indicating a discharge of 63,000 cusecs was at 4 p.m. on 2nd July 1961. The second telegram on the very same date received at 11 p.m. announced the issue of 115,900 cusecs. Peak discharges issues from the Krishnarajasagara on the 3rd July 1961 was 1.7 lakhs at 8 p.m. and this rose to 1.77 lakhs cusecs on the 4th July 1961 (8 p.m.) and 1.9 lakhs at 8 p.m. on the 5th July 1961. It is also worth mentioning that as a measure of abundant precaution and to know in advance the flood situation in the Cauvery Upper Catchment, the Subdivisional Officer of the Madras Public Works Department stationed at Mysore was specifically asked to send frequent telegrams to Mettur and the Chief Engineer for Irrigation indicating the discharges at Krishnarajasagara and the Kabini river, which is a tributary below the Krishnarajasagara and above the Mettur Dam. These flood warning telegrams therefore helped the Public Works Department to assess in time the receipt of floods into Mettur Dam and to suitably regulate the issues from Mettur Dam. In view of the extraordinary nature of rains in Coorg this year, the Superintending Engineer, Public Works Department, Coimbatore Circle, was continuously stationed at Mettur Dam to regulate the issues from Mettur Dam, even though normally the Executive Engineer, Mettur Dam, is expected to attend to this duty. As a special measure, the Chief Engineer (Irrigation), Public Works Department, kept himself in close touch with the Superintending Engineer, Public Works Department, Coimbatore, camping at Mettur Dam, so that the maximum possible flood control could be achieved with the limited help available, viz., Mettur Dam and Bhavani Dam.

5. Even on the 3rd July, the Mettur level stood at 89.75 feet or nearly 30.25 feet below the full reservoir level (120 feet). The level in the Mettur Reservoir was at 105.9 feet on the 4th July and it was below the F.R.L. until 11 p.m. on 5th July. The crest of Ellis saddle surplus is at level 100 feet and an appreciable flood discharge is possible only with a head of 5 feet over this crest: that is, only if the water level reaches 105 feet level, surplus

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discharge could be of any useful magnitude. At lower levels, the discharges from Mettur could not be significant at all. Below the Mettur Dam, the rivers Bhavani, Amaravathi and Noyyal which are tributaries to Cauvery also carried floods due to heavy rains in their own catchments. The combined effect of the issues from Mettur Dam and the flows in the Bhavani, etc., rivers, was expected to be very heavy and so even on the 5th July the issue from Mettur Reservoir was carefully regulated as a measure of flood control. Subject to operational difficulties, the discharge from Mettur Dam was so very carefully regulated to suit the expected inflows by studying the situation every hour. The issue from Mettur Dam was stepped up gradually to about 1 lakh cusecs at 4 p.m. on the 5th and to 1.91 lakhs cusecs at 11-30 p.m. on the very same day. Heavy issues much earlier were not possible as the reservoir had not risen sufficiently high. It had to be increased to 2.84 lakhs on the 8th July 1961. It is to be noted that Bhavanisagar across Bhavani river, another tributary of Cauvery, was also simultaneously surplussing heavily. The combined discharge from Mettur and Bhavani was in excess of 3 lakhs cusecs on the 6th July; the brunt of this flood was felt at Upper Anicut between 2 a.m. and 9 a.m. on the 7th July. The discharge that had to be let down into Coleroon, after drawing our irrigation requirement under Cauvery, Vennar and Grand Anicut Canals (the maximum of which is within 26,000 cusecs), was more than the normal carrying capacity of the Coleroon river.

6. The details of the immediate action taken are set down in the succeeding paragraphs:—

The Madras Government initiated very prompt action to meet the flood situation as soon as they received intimation that heavy discharges were being issued from the Krishnarajasagara from 3rd July 1961 onwards. This was a warning that there was likely to be unprecedented floods in the Cauvery; the following were the important actions immediately taken by Secretary, Public Works Department, in consultation with Chief Secretary:—

(i) Immediate warnings were issued to the Public Works Department officers, the Collectors of Coimbatore, Salem, Tiruchirappalli and Thanjavur districts, Inspector-General of Police and the General Manager, Southern Railways, to take all precautionary measures along the coast of the Cauvery and Coleroon rivers so that damages to life, property and cattle could be averted.

(ii) Sri K. V. Ekambaram, Chief Engineer (Irrigation) was re-called from leave and was instructed to establish his headquarters at Thanjavur to study the flood situation on the spot and to give necessary directions to the departmental officers to meet the flood situation.

(iii) Sri P. Siraiuddin, Chief Engineer (Highways and Rural Works), was instructed to establish his headquarters at Tiruchirappalli to study on the spot the position regarding the road communications and to take immediate action to meet the situation.

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(iv) A flood relief circle with one Superintending Engineer and four divisions was formed with headquarters at Thanjavur.

(v) A special control room was established in the Secretariat under the personal direction of Secretary, Public Works Department, to receive messages and to issue instructions then and there, in close collaboration with the Police Wireless Communication System. This was manned by Officers of the Public Works Department, Secretariat and the Chief Engineers right round the clock. In addition to receiving hourly wireless messages from the various control points, this control room enables the authorities to have direct contact with the officers on flood duty, ascertain their needs and to arrange for their requirements without loss of time.

(vi) In addition to two wireless transmission stations already available with the Collectors concerned, additional wireless stations were placed at the disposal of the Collectors concerned, i.e., 4 with the Collector of Thanjavur, 3 with the Collector of Tiruchirappalli, 3 with the Collector of South Arcot and 1 with the Collector of Salem.

(vii) Wireless Communication sets were promptly installed at all vulnerable points, namely, Mettur, Lower Bhavani Dam, Grand Anicut, Thanjavur, Tiruchirappalli, etc. This facilitated in a great measure the exchange of information between points on the route of Cauvery or its tributaries and greatly helped the Public Works Department in regulating the discharges from the reservoirs. On account of these wireless stations, it was possible to issue immediate orders from the Public Works Department Control Room to Collectors of neighbouring districts to send assistance to places required without any delay.

(viii) Necessary contingents of Malabar Special Police and Special Armed Police were placed at the disposal of the Collectors of South Arcot, Salem, Tiruchirappalli and Thanjavur to help in the evacuation of people in the flood-affected areas and also to protect properties.

(ix) One L.A.F. Dakota was requisitioned and stationed at Tiruchirappalli for reconnaissance and relief work.

(x) Twenty-four military canvas boats operated by a crew of about 100 army men, were requisitioned from Bangalore to help in evacuation and relief operations.

(xi) Two Companies of Sappers and Miners from Bangalore and two companies of infantrymen from Madras were requisitioned and they were used for closing the breach at Koiladi.

(xii) Two Assistant Directors of Public Health were placed on special duty, one at Chidambaram and the other at Bhavani for prevention of epidemics in the flood-affected areas. They were provided with sufficient staff, transport and medicines.

(xiii) Sri Ghazi, Director of Fisheries, was appointed as Special Officer with headquarters at Chidambaram for mobilising country crafts and motor boats for relief operations. The State Port Officer and the Port Officers of Nagapattinam and Cuddalore were directed to assist Sri Ghazi in marshalling country crafts and motor boats.

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(xiv) The Collectors of districts were directed to open gruel centres in the flood-affected areas, wherever necessary. They were also directed to immediately give monetary help to the extent of Rs. 40 per family.

(xv) The Director of Agriculture was instructed to collect kuruvai seeds and distribute them to the ryots in the flood-affected areas.

(xvi) The Director of Animal Husbandry was instructed to make fodder available to the cattle evacuated from the affected areas.

(xvii) Arrangements were made with the Regional Director of Food and the Chief Operating Superintendent, Southern Railways, to despatch 15,000 bags of rice at the rate of 5,000 bags to each of Thanjavur, Tiruchirappalli and South Arcot districts, as early as 9th July 1961. Subsequently sufficient reserve stock was sent to the districts to meet their requirements.

(xviii) The Collectors of Madurai, Ramanathapuram, Chingleput and North Arcot were directed by wireless to send jeeps to help the officers on special duty. The Collectors were also directed to send empty gunny bags to the various districts, viz., Tiruchirappalli, Thanjavur and South Arcot and the target was fixed for each Collector.

(xix) Special arrangements were made with the Railway authorities to use the Workshop facilities available at the Golden Rock Railway Workshops.

(xx) The Port Officers, Nagapattinam and Cuddalore, were sent along with experienced boatmen and divers to close the breach at Koiladi and Thirukattupalli.

7. On the evening of 6th July, Minister (Electricity) [on behalf of Minister (Works) who was in the General Hospital] flew to Thanjavur accompanied by Sri K. V. Ekambaram, Chief Engineer (Irrigation) who was compulsorily recalled from leave and held a conference with the District Collectors of Thanjavur and Tiruchirappalli, Superintendent of Police, M.L.As. and other departmental officials and decided on the course of action to be taken to countermand possible flood havoc. Soon after the conference with the officials and M.L.As. the Minister accompanied by the Collectors visited the Grand Anicut, Upper Anicut, Bhavanisagar and Mettur for an on-the-spot inspection and for ensuring that all the precautionary steps have been taken to avoid damages to crops, persons and property. He also visited Coimbatore and Salem.

The following day (7th July 1961) Minister (Works) immediately on coming out of the hospital, Secretary, Public Works Department, Chief Engineer, Public Works Department (General) and Chief Engineer (Highways and Rural Works) flew to Tiruchirappalli in a chartered plane, made an aerial survey of Tiruchirappalli and Thanjavur districts studying the flood situation and on the morning of 8th July held a conference with Minister (Electricity) and other officials and devised ways and means to be adopted to meet the flood situation.

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The Minister for Works toured in the Tiruchirappalli-Thanjavur districts. He visited Musiri taluk and inspected a number of villages which were affected by floods, namely, Sandapattai, Karakad, Mullikkarai, Seepalaputhur and Sriramasamudram and gave instructions to the local officials to take necessary remedial measures.

He also instructed the District Collector and Public Works Department officials to divert a part of the surplus waters of Cauvery and Coleroon into Pullambadi, Melakkattalai and Grand Anicut Canals, so that the pressure of water in Cauvery and Coleroon rivers could be reduced at least to some extent. Then he visited Buthalur and gave necessary instructions to the local officials. On hearing that the villagers of Palamaneri, Vishnampet, Valappakudi, Thirukkattupalli and Nadukkaveri were all stranded, the Minister gave instructions to send some boats to evacuate them. In the evening the Minister inspected the breached spot of Chatram Nidar. He also arranged for the evacuation by boats of the people of Manamkorai, Iyempet, Thandankorai, etc., villages who were affected by floods. Then he inspected the closing of heavy breaches in the left bank of Vettar river and instructed the engineering staff to strengthen the right bank of the western side of the Vettar river. Then he visited Thittai and inspected the arrangements for the feeding of the people who were affected by the floods. He also inspected the feeding arrangements made in the Palace grounds, Bragadeeswar temple, Gnanam Talkies, Papala Chatram and the Municipal Sowrashttra Girls' High School.

Again on a subsequent date Minister (Works) accompanied by Commissioner of Land Revenue, Collectors of Thanjavur, Tiruchirappalli and Inspector-General of Police had an aerial survey of the entire course of the Cauvery from Tiruchirappalli to Mettur Dam and the surrounding places of Grand Anicut.

Again on 2nd August 1961 the Minister for Works toured intensively the flood-affected villages in Thirukkattupalli, Nadukkaveri and Tiruvaiyaru zone and inspected the relief operations.

On 12th July 1961 the Chief Minister and the Minister for Industries accompanied by the Commissioner for Land Revenue inspected the Koiladi breach and on subsequent dates intensively toured the flood-affected areas of Tiruchirappalli, Thanjavur, South Arcot and Coimbatore districts. They also visited Thirukkattupalli by a steam boat to inspect the affected villages. They inspected the breach near Old Coleroon at Vallambadugai and heard the representation of the victims of the flood-ravaged Pavalakodi hamlet. They also met the villagers of Perambathur village en route to Javankondapattinam and inspected all the breaches en route reaching the place up to where the jeeps could go. They walked some distance and also travelled by bullock-cart and inspected the breach at Karaimedn. On their way they distributed food packets to the flood victims. The Chief Minister also visited the affected villages in Karur taluk, in Tiruchirappalli district.

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The Home Minister also inspected the breach at Koiladi and the water-logged areas near Tiruchirappalli.

The Chief Minister and the Home Minister had also an aerial inspection of the areas between Tiruchirappalli and Chidambaram including Thanjavur.

The Union Minister for Defence accompanied by the Collectors of Thanjavur and Tiruchirappalli inspected the breach-closing work at Koiladi. Minister for Transport and Communications also visited the breach site of Kollam and the flood-affected areas and the feeding centres and undertook an aerial survey of the affected areas in Thanjavur and Tiruchirappalli districts.

The Minister for Electricity paid subsequent visits to the flood-affected areas and breached sites from 7th August 1961 night to 9th August 1961 and again on 10th August 1961 and 11th August 1961. He also addressed a conference of the district officials on 9th August 1961 and reviewed the flood relief work.

Soon after his return from his tour abroad, the Minister for Finance rushed to tour the flood-affected areas in Tiruchirappalli, Thanjavur and Coimbatore districts on the 14th and 15th August 1961.

8. It will be seen from the above that the entire Government machinery in the affected districts and in the State Headquarters were geared up into action to meet any emergency well in time. Even the Public Health staff were in position long before the emergency had arisen. The very fact that there was no loss of human life in spite of the floods of this magnitude will speak volumes on the timely and effective action taken by the Government and their officers.

9. Sri Ahuja, Chief Engineer, Central Water and Power Commission, who came to Madras on the 18th July 1961 discussed the flood situation and the action taken by the Government with the Secretary to Government, Public Works Department. After acquainting himself with the various details of the administrative action and precautionary measures initiated in time by the Government, the Chief Engineer (Sri Ahuja) expressed appreciation of the timely action taken by this Government to meet the situation. He was glad to express to the Press that the precautionary measures taken by this Government much in advance of the actual floods should serve as an object lesson to other States in India.

10. It is only unfortunate that notwithstanding the timely precautionary measures taken by the Government to patrol the banks of the Aganoda Cauveri and the Coleroon and other vulnerable points the unprecedented floods after the construction of Mettur Dam in 1934, had caused slips in the banks and had also caused breaches. The major breach was at the right bank of Coleroon which bank was also common to both Coleroon and Cauvery and this occurred between M. 18/6 and 19/0 and this was about a mile below the Grand Anicut near Koiladi village. This breach

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occurred in the early hours of 7th July. The level of Coleroon at Upper Anicut was about 8.50 on the 6th July and it rose to 15.50 within a few hours; such sudden rise in the flood level naturally caused damages to certain weak points of the bank. Owing to this sudden rise in the flood level, the breach near Kolladi village (i.e., in the common bank between Coleroon and Cauvery about a mile below the Cauvery) had occurred. This breach rapidly widened to 1,000 feet as a result of the continuous nature of the high floods, making it impossible for any operations to close this breached gap. Waters from the Coleroon naturally therefore found their way into Cauvery and this in turn has caused several breaches in the rivers, Cauvery, Kodamuriy and Arasalar and their branches. Two major breaches were caused in the right bank of Cauvery above Thirukkattupalli and the breached waters ultimately found their way into Vettar. The breached waters spread over the country all along causing damages.

11. The officers of the Public Works Department had to put up a very stiff fight against the floods in closing the breach at Kolladi under the personal directions of the Chief Engineer (Irrigation). The inflow into Vettar Dam was such that very heavy discharges had to be maintained; even then the water-level rose to 125 feet and the Government and officers of Public Works Department had to take a calculated risk in keeping such a high level with a view to plug up the Kolladi breach as quickly as possible. Nature was however against and the inflow continued to be high and hence the works at Kolladi had to be slowed down for a few days. When again the flow level was within reasonable limits and the current was controllable, the Officers of the Public Works Department, Army, Port authorities and the boatmen from Nagapattinam and Cuddalore, Police and Fisheries staff made a last and successful bid in closing the Kolladi breach and successfully closed it at 1.30 a.m. on the 30th July 1961. In all it took about 23 days but actually the number of days when effective operations was possible was just ten days as on other days, the Coleroon was running very high.

12. After the closure of the Kolladi breach the Public Works Department staff concentrated on the closing of the major breaches at Agarapettai and Palamaneri on the right bank of the Cauvery above Tirukkattupalli. These two breaches were also closed; the Agarapattai on 2nd August and the Palamaneri breach at 6 a.m. on the 9th August. These two breaches were also quite big and the officers had to fight hard day and night against the floods before they could close these breaches. There are several other breaches in the delta and the details of these breaches are listed in the Annexure B appended to this statement. All these breaches have been successfully ring-bunded and supplies are drawn now in the various channels. In the lower reaches of Cauvery and its breaches scarcity of supplies was felt as the flows in Cauvery had to be restricted owing to the breaches above Tirukkattupalli. This was only till the 9th instant because after the ring-bunding was done

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at the breach sites, supplies were gradually increased in the Cauvery and it was 4,500 cusecs at 12 noon on the 10th instant. And this was again increased gradually on 17th August to 9,000 cusecs which is almost normal supply.

13. The magnitude of the floods received in Cauvery during the current season was enormous as already said above. The total volume of Mettur surplus within three weeks in July amounted to about three lakhs M.C.Ft. and this was more than three times the gross capacity of the Mettur Reservoir. Similarly the Bhavani and the Amaravathi rivers had also surplussed for four weeks continuously and the total quantity was $1\frac{1}{2}$ to 2 times their respective capacities. This was a record indeed. Government were convinced that as a result of the advance warning, timely action was taken by the authorities to evacuate people from low lying areas to place of safety. And it is gratifying to note that there was absolutely no loss of human life. Reports received show that some old houses standing on the banks of rivers at low places have collapsed or were damaged, as a result of the very high floods. It is also gratifying to note that apart from the breaches in the banks or rivers and channels which were inevitable, in such floods, there was no appreciable damage to any structures. Damages were however caused to a submergible inspection track bridge below the Pressure Aqueduct conveying Mettur Canal waters. A drainage sluice at Varahalur on the left bank of the Coleroon was washed away.

14. Government are also happy to note that the public co-operated willingly and enthusiastically to their best in the flood-affected areas and they are very thankful to them for courageously bearing with the Government.

15. The Government are aware that some dislocation has been caused to the normal irrigation in the delta but we are quite confident that the public will bear with them because this was the result of conditions beyond human control. Government desire to assure that active steps are being taken to restore normalcy in the delta as quickly as possible. In order to achieve this purpose, special staff has also been sanctioned for attending to the needs of the numerous channels and rivers within the Cauvery delta.

16. The Government have taken immediate action to restore conditions of normalcy within the quickest possible period and to achieve this the following measures are being taken :—

- (1) Ring-bunding the breaches followed by regular closure of the breaches;
- (2) Repairs to irrigation structures like sluices, regulators, etc.;
- (3) Silt clearance of channels.

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17. The Chief Engineer (Irrigation) has been instructed to assess the damages caused by the recent floods and to draw up a programme for work fixing time limit for the completion of each item of work. He has also been instructed to allot specific work to the various divisions of the Flood Circle and regular divisions with a view to ensure that there is no overlapping of work between the regular and flood circles; that there is proper co-ordination among the various divisions and that the restoration of the work is completed within the shortest possible time.

18. As regards damages caused to roads by the floods, the breach closing and restoration work are being treated as emergency works and most of the breaches have been closed and traffic restored already. As regards Thanjavur, where the damages are very heavy, a Special Divisional Engineer with Headquarters at Kumbakonam has been appointed to attend to the flood damages reconstruction works. He is assisted by three Special Assistant Engineers and twelve Special Junior Engineers. Action is being taken to prepare estimates for complete reconstruction and to execute the work on a planned programme drawn up to complete the work by the end of December 1961. A statement of the roads badly affected by the floods in Thanjavur district is given in Annexure C. Almost all the breaches have already been closed. The Chief Engineer (Highways and Rural Works) has been requested to inspect immediately all the roads where breaches have occurred and instruct the concerned Divisional Engineers to form pucca roads without delay.

As regards the relief measures ordered by the Government for the flood affected areas, attention is invited to the statement in Annexure A.

19. The Government are also considering a number of long term measures to be investigated and implemented wherever feasible with a view to avoid recurrence of flood of such magnitude and their after-effects and for this purpose, they have already appointed a Special Officer of the rank of Superintending Engineer to make a thorough investigation of the various long-term measures including the items given below. The measures under consideration by the Government are :—

(i) Strengthening of the common bund between the Cauvery and the Coleroon for about 5 miles.

(ii) Provision of emergency breach sections and emergency surplus course.

(iii) Provision of shutters at the Upper Anicut for diverting flood flows of the Cauvery entirely into the Coleroon as this would facilitate repairs, etc., to be carried out at Grand Anicut or below, which is not possible now.

(iv) Increasing the usefulness of Mettur Dam as flood moderator by making it hold up water up to 130 feet in an emergency. Provision of regulators at the Mettur F. Saddle in lieu of earthen bunds now existing.

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(v) Re-modelling the shutters of the Ellis saddle so that it might be possible at times of emergencies to hold the entire flood inflows into Mettur Reservoir without having the necessity to issue and without over-topping the shutters.

(vi) Equipping the Public Works Department with modern accessories and devices as shown below so that any breach-closing operations could be completed very expeditiously :—

(1) Pontoon boats for sinking, when the currents are swift and the breach is deep.

(2) Collision mats for deflecting the current away from the breach site.

(3) Motorised catamarans.

(vii) Taking up special investigation to explore the possibility of diverting Cauvery river at the higher reaches to Pennar, Vellar, Tirumanaimuthar, Jedarpalayam, etc., during heavy floods.

(viii) Exploring the possibilities of putting additional reservoirs at Hoganaikal and other places.

(ix) Re-examination of the carrying capacity of irrigation and drainage courses and standards for banks, etc.

(x) Removal of encroachment of river margins and Padugais.

(xi) Afforestation of padugais.

(xii) Improving river training works on modern lines.

(xiii) Re-examination of reservoir regulation rules, and flood warning systems.

(xiv) Approaching the Centre for setting up a Flood Operating Squad in the Ministry of Defence just as we are having Fire Fighting Squads to put out fire in an emergency. This squad should have men trained in the modern methods of closing breaches. They should be able to air-lift the equipments and machines (Government of India have been addressed in this regard separately).

20. The question of approaching the Centre for financial aid in implementing the flood control measures is also receiving the attention of Government and will be taken up with the Centre at appropriate time.

21. From the assessment so far made, the cost of putting up ring bunds at all the various breach points, as a result of the floods in the Cauvery is estimated to be about Rs. 20 lakhs. It will be sometime before a correct assessment of restoration of banks is made. It is expected that the cost of the restoration of banks at breached sites may be Rs. 30 lakhs.

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22. The Government wish to place on record their appreciation of the services rendered by the Officers of the Public Works Department, Revenue, Police, Port and other Departments and also army authorities who did their best to fight against the floods against great odds and to alleviate the distress in the flood affected areas. But for their all-out efforts, the damages would have been much more, considering the magnitude of the floods. The Government are glad to note that the Members have shown their keen interest in the welfare of this State and its people and trust that the Members would give their valuable support in the efforts of the Government to solve various other problems coming in the wake of such record floods.

ANNEXURE A

A. RELIEF MEASURES AND DAMAGES DUE TO THE FLOODS IN THE CAUVERY AND ITS TRIBUTARIES.

A complete assessment of the damages due to the floods in the Cauvery and its distributaries and of the rehabilitation—both temporary and permanent—required has not been finalised as the floods continued well into the second fortnight of July 1961 and field staff were fully occupied with the immediate steps necessary for meeting the threatened and actual flood situation. The statement below gives details of the damages in the districts of Tiruchirappalli, Thanjavur, South Arcot, Coimbatore and Salem and the rehabilitation measures so far assessed.

There was no loss of human life in any of the districts due to floods in Cauvery and distributaries. Less than a dozen head of cattle and sheep are reported to have been lost. The damage to private property was extensive and the amount so far assessed is well over Rs. 40 lakhs. Public property, mostly roads and canals and river banks were damaged and the approximate estimate for repairs so far estimated runs to Rs. 30 lakhs. Though there have not been complete loss of crops in large extent of lands, over 6,000 acres of lands have been affected partially either by submersion of the crops or seedlings or by sand casting, requiring extensive reclamation. Railway tracks were damaged in Thanjavur district leading to dislocation of communication. The total figures of damages to be finally estimated may well be over a crore of rupees.

Due to the prompt measures taken in anticipation of the floods, people affected in the low lying areas were evacuated to places of safety; feeding centres were opened; cash grants of Rs. 30 per head and clothes worth Rs. 10 were granted liberally; palmvrah and thatches for reconstructing damaged houses were also distributed. Seeds were procured and supplied by the Agriculture Department at 2/3 cost. Orders have been issued for a liberal grant of loans under the Takkavi rules both on personal security and on security of immovable property. Mass inoculation was carried out in the evacuee camps by the Health Department. The livestock were

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also attended to by the Veterinary Department. Collectors have also taken up permanent measures towards rehabilitation of the affected persons in the low lying areas by taking up land acquisition of suitable sites and for strengthening the weak points on river banks.

Apart from the relief measures taken up by the Government, local public help, both from private individuals and institutions by supply of clothes, food and cash were forthcoming and was utilized.

Thanjavur district.

In Thanjavur district, the impact of the flood was first felt by the Grand Anicut on the evening of 6th July 1961 and on the same night the Coleroon breached its bank in two places in the north within Tiruchirappalli district and in one place in the South-Koviladi in Thanjavur district. On 8th July 1961 there was a second breach in the Southern bank of the Coleroon lower down at Maharajapuram in Kumbakonam taluk limits. The major breach occurred at Koviladi. Damages were caused to roads and railway track. Three hundred and forty-three villages covering an area of over 1 lakh of acres in the various taluks were affected. The evacuees from these villages numbering about 150,000 were stationed at Thanjavur and other important centres. The major breach in Coleroon at Koviladi was closed on 30th July 1961 with the assistance of Army personnel and the Public Works Department. One hundred and thirty-seven feeding centres were opened in the various places and the number of persons fed at these centres went up to 120,000 during the peak of the flood. The cost of running the feeding centres is estimated roughly at Rs. 4 lakhs. Kuruvai seedlings were destroyed in about 3,000 acres and kuruvai crops in about 2,000 acres were affected. The total short-fall in Kuruvai cultivation this year is likely to be 13,000 acres approximately. Fifty-two fair price shops were opened in the flood-affected areas. The total number of houses damaged by the floods is about 12,000 and roughly Rs. 5 lakhs has been sanctioned for reconstruction of houses. Cash grants to the extent of nearly Rs. 3 lakhs have been disbursed so far at the rate of Rs. 30 per family and Rs. 10 towards clothing grant. Supply of building materials like thatch and bamboo was also arranged. Field staff from Ramanathapuram and Madurai districts have been placed on duty here for relief work and a provisional allotment of Rs 10 lakhs has been made for sanction of cash grants and supply of building materials for reconstruction of the damaged houses.

South Arcot district.

In South Arcot district, due to heavy discharge into the river Coleroon, several breaches occurred on the left bank of the river and an extent of 30 square miles was affected. One thousand three hundred and thirty-three families in 20 villages were affected by the floods and a cash grant of Rs. 30,000 has so far been disbursed to the victims of floods. Feeding centres were opened in the affected areas and about 6,000 people were fed. One thousand acres of double crop wet land were under submersion and therefore could not be cultivated for the kuruvai season; the crops on

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another 100 acres of land have been affected by the floods. About 211 acres of land have been sand-cast to depth of 2 feet and would require extensive reclamation. Extensive damage has been caused to the irrigation sources and would require approximately Rs. 3 lakhs for repairs.

Tiruchirappalli district.

In Tiruchirappalli district, due to floods in the Cauvery and the Coleroon, there were breaches in the Coleroon bank and 49 villages were affected. Two thousand five hundred and eighty-one families were affected by the floods and cash grants amounting to Rs. 40,000 (approximately) have been disbursed so far. Twenty-five feeding centres were also opened to feed the victims. About 7,000 acres of land were water-logged and crops of sugarcane and betel vine in Karur taluk have been affected. The damage to sugarcane and betel crop is estimated at Rs. 2.5 lakhs. There was no dislocation of railway lines but seven roads were affected. The assessment of the damages caused has not been finalised here.

Coimbatore district.

In Coimbatore district the floods in the Cauvery and Bhavani rivers coincided and the village first affected was Sirumugai and the Bhavani Town. The number of houses and huts damaged comes to 2,800 roughly and the total value of the damage is estimated at Rs. 4,92,015. Crops on an extent of 1,601 acres valued at Rs. 7,58,155 were affected. The cost of restoration of Highways damaged by the floods is estimated at Rs. 1,69,000. The cash relief that will be granted to the victims of floods is estimated roughly at Rs. 1,12,680. The Collector has proposed to acquire lands for the Harijans and poor caste Hindus living on either poramboke and natham sites close to the river margins in Sirumugai, Bhavani and parts of Erode taluk. Orders have been issued for sanction of loans under the Intensive Manuring Scheme by relaxing the rules in order to cover the expenditure on purchase of seeds, pesticides and cultivation expenses. Loans up to a maximum of Rs. 50 per weaver were sanctioned to handloom weavers towards the repair and replacement of looms damaged or lost due to the floods. Orders have also been issued for the grant of a loan up to Rs. 1,000 for repairing and rebuilding houses and up to a maximum of Rs. 250 for reconstruction of houses situated on poramboke lands.

Salem district.

In Salem district, 452 houses were completely damaged and 258 partially damaged. One hundred and thirteen families were rendered homeless. The estimated value of loss is roughly Rs. 3 lakhs. The amount so far sanctioned to the people rendered homeless comes to Rs. 23,700. In addition to this, corn meal and maida flour packets were distributed to the victims affected by floods in Sankari taluk. Eleven roads have been damaged and the bunds of Raia Channel in Pallipalavam and the Jedarnalavam Bed Regulator consisting of masonry structure with a platform raised on stone pillars in the middle of the Cauvery river were also affected. The estimates for repairs have not yet been finalised.

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**B. RELIEF MEASURES AND DAMAGES DUE TO RAINS IN
KANYAKUMARI AND THE NILGIRIS DISTRICTS.**

Kanyakumari district.

Due to heavy rains, one person lost his life in the collapse of a mud wall; there was no loss of cattle. Five hundred and fifty houses either collapsed or were damaged and 500 families consisting of about 2,000 persons were rendered homeless. The Collector has sanctioned a sum of Rs. 2,745 as cash relief to 122 families for reconstruction of houses. The cost of repairing the roads damaged and closing the breaches is estimated to cost Rs. 6 lakhs roughly. Owing to the floods 3,270 acres of paddy, 105 acres of Tapioca, 55 acres of betel vine and 68 acres of plantain were damaged. Orders have already been issued for the supply of seeds at the half subsidised rate.

The Nilgiris district.

Due to heavy rains in the area, a land-slip occurred in Cheran-gode village in Gudalur taluk, and as a result 12 persons lost their lives and cattle numbering 30 valued at Rs. 1,000 were lost. Four houses collapsed and two damaged. Two families were rendered homeless. The Collector has granted Rs. 30 each to the two families and Rs. 15 to one family.

Owing to the floods, as a result of rains in Ootacamund, five persons lost their lives and 15 cattle valued at Rs. 3,500 were lost. Three houses collapsed. Three families rendered homeless. The Collector has granted cash relief of Rs. 30 to the affected families. Besides this ten houses constructed by the Harijan Welfare Department in Cheenath Paniya Colony, one house in Kargudi Tribal Colony in Gudalur taluk, two mazdoors line and three houses in Rockwood estate of Gudalur taluk were also damaged. As a precautionary measure, the families living in Karapadu, hamlet of Bikkatti village were evacuated as there was a likelihood of a land-slide in that area. Due to the land-slide, communications in Ootacamund and Gudalur taluks were dislocated. The Gudalur-Calicut road at Nadugani had sunk to a depth of 12 feet for a length of 300 feet. On Gudalur-Vaithiri-Calicut road between Devala and Pandalur a big land-slide had occurred. The Gudalur-O'valley road was also damaged very badly. The Ghat roads were also damaged. It is estimated that about Rs. 5 lakhs will be needed for restoration of the Highways roads and one lakh for Panchayat Union roads.

Steps taken by the Food and Agricultural Department

In order to meet the requirements of Gruel Centres opened in the flood-affected districts, the Collector of Madras was requested to obtain rice from the Regional Director (Food) from his storage depots in the City of Madras and rush them to the affected districts. The Chief Operating Superintendent and Divisional Superintendent, Southern Railway, were also requested to move part of these stock

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by attaching some wagons to the mail and passenger trains. In all, 18,000 bags of rice were supplied to the districts of Thanjavur, Tiruchirappalli and South Arcot. In addition to these, the Regional Director (Food), Madras, was also requested to keep adequate stocks in his storage depots at Tiruchirappalli and Cuddalore to meet the requirements of Collectors.

At the request of the Collector of Thanjavur for supply of milk powder, 570 cartons (54 lb. each) of milk powder, which were readily available with the Director of Public Health, Madras, were sent to Thanjavur. Besides, the District Health Officer of flood-affected areas were also instructed to divert the skim milk powder stocks already supplied for the regular Maternal and Child Health feeding programme in their districts for flood relief.

The Government have sanctioned the purchase and distribution of 3,218 bags short-term paddy seeds at a cost of Rs. 93,867 and 1,000 bags of Samba seeds at a cost of Rs. 30,000 to the ryots in the flood-affected areas in Thanjavur and Tiruchirappalli districts at two-third cost, the Government bearing the one-third of the cost as subsidy. Similarly, 195 bags of Samba paddy seeds will be distributed to the ryots in flood-affected area in Chidambaram taluk in South Arcot district.

An adequate number of tractors has been diverted to Thanjavur district for reclaiming 500 acres of lands which have been sand-cast by the floods. The work has been taken up by the Joint Director of Agriculture (Package Programme).

The Deputy Director of Animal Husbandry (Livestock) was specially deputed to tour all flood-affected areas to assist the local veterinary officers to protect all cattle against cattle diseases. The Superintendents of all Livestock farms in this State were asked to send to the flood-affected districts the surplus quantity of paddy straw available with them for feeding all the evacuated cattle. The surplus as well as the paddy straw obtained from philanthropic gentlemen were distributed to the cattle owners free of cost up to 12th July 1961. Thirty tons of paddy straw were obtained and distributed to the evacuated cattle at 5 lb. per head. The affected cattle were protected on a mass scale against cattle diseases and the disease position was effectively kept under control.

ANNEXURE B.

Serial number and name of river.				Mileage.	R.F. or L.B.	Location (nearest village).	Details of breach of overwash (only approximate) in feet.
(1)				(2)	(3)	(4)	(5)
FLOOD CIRCLE.							
Tiruchinappalli district.							
1	Coleroon	..	..	16/7	L.B.	Kuhur, Lalgudi taluk.	75 x 10
2	Do.	..	..	29/2	L.B.	Varahalur, Lalgudi taluk.	100
3	Do.	..	..	49/0	L.B.	Vappur and Muthuvancheri of Udayarpalayam taluk.	120
4	Do.	..	..	51/5—6	L.B.	Do.	120
Thanjavur district.							
1	Coleroon	..	..	18/0—19/0	R.F.	Sukkambar, Thanjavur taluk.	2,000 x 30
2	Do.	..	..	61/2—3	R.B.	Maharajapuram, Kumbakonam taluk.	75
3	Do.	..	..	65/4—5	R.F.	Ammayappan, Kumbakonam taluk.	100
4	Do.	..	..	66/4—5	R.B.	Do.	100

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Serial number and name of river.	Mileage	N. or L.B.	Location (nearest village).	Details of breach (or overwash only approximate) in feet.
(1)	(2)	(3)	(4)	(5)
FLOOD CIRCLE—cont. South Arcot District.				
1 Coleroon	94/0	L.B.	Vallampadugai	150
2 Do.	95/7—97/0	L.B.	Jayankondanputram, Chidambaram taluk.	100
3 Do.	97/2—3	L.B.	Do.	475
4 Do.	97/5—6	L.B.	Do.	160
5 Do.	97/6—7	L.B.	Do.	100
6 Do.	97/6—7	L.B.	Do.	250
7 Do.	98/1—2	L.B.	Kilichimukkalipalai, Chidambaram taluk.	150
8 Do.	98/2—3	L.B.	Do.	2,100
9 Do.	98/6—7	L.B.	Do.	160
10 Do.	99/6—7	L.B.	Do.	150
THANJAVUR CIRCLE. Cauvery Division (Thanjavur district).				
1 Cauvery	24 to 25/0	R.B.	Agarapettei	Breach 1,000 × 8,
2 Do.	26/5—6	R.B.	Palamaneri	600 × 12
3 Do.	37/0—1	L.B.	Thiruvaiyaru	80 × 15 × 16

4 Do.	..	..	..	39/6-7	R.B.	Kalyanapuram ..	450×30×15
5 Do.	..	..	..	48/5-6	R.B.	Kabistalam ..	200×15×6
6 Do.	..	..	..	49/0-1	R.B.	Do. ..	30×18×3
7 Do.	..	..	..	49/3-4	R.B.	Do. ..	20×15×4
8 Do.	..	..	..	50/2-3	R.B.	Umayalpuram ..	10×15×4
9 Do.	..	..	..	50/5	R.B.	Do. ..	70×15×6
10 Do.	..	..	..	50/5-6	R.B.	Do. ..	30×10×3
1 Arasalar	..	..	..	47/2-3	R.B.	Do. ..	30×6×7
2 Do.	..	..	..	46/3-7	R.B.	Sarukkai ..	30×6×2
3 Do.	..	..	..	47/3-4	R.B.	Do. ..	30×6×5
4 Do.	..	..	..	48/1	R.B.	Kabistalam ..	200×8×6
5 Do.	..	..	..	51/1-2	R.B.	Sundaraperumalkoil ..	..
1 Manniar	..	..	..	45/6-7	L.B.	Umbalapadi ..	100×8×6
2 Do.	..	..	..	45/6-7	R.B.	Do. ..	150×8×6
3 Do.	..	..	..	46/4-5	L.B.	Do. ..	150×8×6
1 Kodamuratti	..	..	..	32/4-5	R.B.	Nadukaveri ..	300×6
2 Do.	..	..	..	36/4-5	R.B.	Thirupanthurithi ..	50×30×10
3 Do.	..	..	..	37/6-7	L.B.	Kalyanapuram ..	60×25×10

Serial number and name of river.	Mileage.	R.B. or L.B.	Location (nearest village).	Details of breach or overwash (only approximate) in feet.
(1)	(2)	(3)	(4)	(5)
TRANCOR CIRCLE—cont.				
<i>Cauvery division (Thanjavur district).—cont.</i>				
4 Kodamurutti	39/6—7	L.B.	Kalyanapuram ..	70×30×12
5 Do.	43/7 to 44/0	L.B.	Soolamangalam ..	50×20×5
6 Do.	45/1—2	L.B.	Sarabojirajapuram ..	15×20×5
7 Do.	46/2—3	L.B.	Regundhapuram ..	100×20×5
8 Do.	47/0—1	L.B.	Pandaravadi ..	100×20×5
1 Mudikondan	52/6	L.B.	Nallur	100×10×7
1 Thirumalairajan	52/6	L.B.	Do.	200×12×10
<i>Vennar Division (Thanjavur district).</i>				
1 Vettar	39/4—5	L.B.	Arasur	60×13×6
2 Do.	43/5—6	R.B.	Thittai	300×10
3 Do.	40/7, 41/0	L.B.	Thiruvedagudi ..	90×12×10
4 Do.	61/2—3	R.B.	Do.	150×8
5 Do.	61/3—4	R.B.	Do.	260×8
6 Do.	61/4—5	R.B.	Do.	60×10

7	Do.	..	..	61/5-6	R.B.	Kutchipalayam	60×12
8	Do.	..	..	Do.	R.B.	Do.	40×12
9	Do.	..	..	Do.	R.B.	Do.	50×10
10	Do.	..	..	61/6-7	R.B.	Do.	80×10
11	Do.	..	..	62/4-5	R.B.	Mathur	60×6
12	Do.	..	..	62/6-7	R.B.	Mathur	100×8
13	Do.	..	..	64/5-6	R.B.	Do.	40×8'6"
14	Do.	..	..	65/1-2	R.B.	Vedambur	50×8
15	Do.	..	..	65/6-7	R.B.	Do.	60×8
16	Do.	..	..	68/0-1	R.B.	Do.	60×6
17	Do.	..	..	61/5-6	R.B.	Melakorai and Sithamvalur.	60×8
18	Do.	..	..	75/2-3	L.B.	Manakkal	Breach.
19	Do.	..	..	85/4-5	L.B.	Amoor	Do.
	Sullanar	..	..	5/6 to 18/0	R.B. and L.B.	Madugaram, Adichakud, Avoor, Govindakudy, Kulakudy, Narasingamangalam and Valangiman.	Several branches and over-washing.
	Odanboglar	..	..	70/4-5	L.B.	Ammayappan	Breach.

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Serial number and mileage R.B. or L.B.

Location (nearest village).

Details of breach or overwash (only approximate).

(1)

(2)

(3)

South Arcot district (South Arcot division).

Pichavaram (Chidambaram taluk)

10 Breaches.

Do.

Banks washed off for half a mile length in the tail reach.

Gavarapet Channel

Karungalur Drain

Breach in old Coleroon and over-washings, etc.

Serial number and name of river.

Mileage.

R.B. or L.B.

Location (nearest village).

Details of breach or overwash (only approximate).

(1)

(2)

(3)

(4)

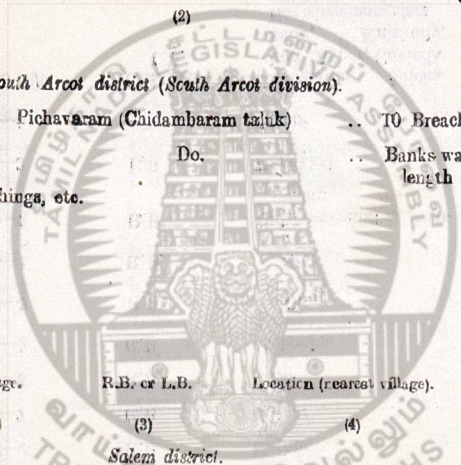
(5)

Salem district.

Mettur Canals (Pressure No. 4 x F. 4 aqueduct).

below Mettur Dam.

Beams, slabs and railings of 33 spans (out of 39 spans) of the jeep inspection bridge of the pressure aqueduct washed away.



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Serial number and mileage R.B. or L.B.	Location (nearest village).	Details of breach or overwash (only approximate).
(1)	(2)	(3)
1 Bhavani river	Below Lower Bhavani Project Dam. R.B.	120' length $\times$ 10' depth erosion.
Besides the above, damages to parapet and revetment, etc.	L.B.	50 feet.
2 Orakkarai Venkataraman Chettiar channel.	L.B.	Breach.
Breach on left side flood bank of Kodiveri anicut damage to outlet in Arakkankottah channel, erosion in the Arakkankottah channel between 0/3-0/4.		
3 Minor breaches in Thadapalli channel at 0/2-0/7 and breach from M. 1/4 to 6/0.	L.B.	

வாய்மையே வெல்லும்
TRUTH ALONE TRIUMPHS

ANNEXURE C.

LIST OF ROADS BADLY DAMAGED BY THE RECENT FLOODS OF JULY 1961.

Serial number and name of road.	Mile and furlong.	Nature and extent of breach.
(1)	(2)	(3)
1 Thanjavur-Thiruvaiyaru Road	M. 5/4	180' long and 8' deep. 200' long and 8' deep.
	M. 5/5	400' long and 8' deep to 10' deep.
	M. 5/6	II Breach—200' long and 7' deep. I Breach—100' long and about 10' deep.
	M. 7/1 to 3	Berms badly eroded and cut.
2 Tanjore Lower Anicut Road (Thanjavur-Kumbakonam Road).	M. 18 1/5—6	Four breaches of 100' each.
3 Thogur to Ayyampet Road	M. 9/4	200' long and 20' deep.
4 Thirukkattupalli-Sengipatti Road	M. 0/8	800' long and 10' deep. III Breach of 180' in 8/1.
5 Saliangalam-Papanasam Road	M. 0/1—10/7	20 Nos. taking from 15' to 200' in length.
6 Valangiman-Papanasam Road	M. 20/0—27/4	2 Nos. of 15' and 20'.
7 Kumbakonam-Mannargudi Road	M. 5/8	12' long.
	M. 6/5	1 No. 4'—0 long.
	M. 6/5	20' long.

M. 6/6 60' long.
M. 6/7 No. 1 120' long.
No. 2 20' long.

M. 7/3 150' long.

M. 6/6—12/0 3 Nos. varying from 40' to 150' in length.

M. 0/1—5/4

M. 13/4 Cut and erosion.

M. 13/3

M. 12/6

8 Thittai-Melattur Road

9 Govindakudy-Melattur Road

10 Poonthottam-Nachiyarkoil Road

